

In the Claims

The following is an amendment to and a complete listing of the claims which replaces all prior listings of claims in this application.

Listing of Claims:

1. (currently amended) A Francis runner comprising:

a crown;[[,]]

a band; and

blades extending between said crown and said band such that a leading edge of each of said blades has points of attachment with said crown and said band and a trailing edge of each of said blades has other points of attachment with said crown and said band, said blades defining between themselves channels for flow of liquid and being rotatable with said crown and said band in a direction defined by a linear component (U),~~characterized in that the~~ and each of said blades has oppositely oriented lateral faces which are spaced equidistant from an imaginary curved median line extending from said leading edge to said trailing edge;

wherein an angle (β_{24}) between the linear speed (U , D_{224}) of progress of one direction defined by the linear component (U) of each of said blades [(2)] and [the] a median straight line [(25,)] (Δ_{224}) of said blade at the level of its extending from the median line of each of said blades at said trailing edge [(22)] thereof, has, in the vicinity of the at said point [(224)] of attachment of each of said [blade] blades on said band [(4)], a value included between 20 and 25°.

2. (currently amended) ~~Runner~~ The runner according to Claim 1, ~~characterized in that wherein,~~ over [the] a length of [the] said trailing edge [(22)] of ~~each of said blade (2) blades,~~ [the] an angle (β_2) between said linear speed (U , D_2) and said direction defined by the linear component (U) and [said] a straight median line [(25,)] (Δ_2) extending from the median line of each of said blades at said trailing edge [(22)] thereof has a maximum value less than 34°.

3. (currently amended) ~~Runner~~ The runner according to Claim 1, ~~characterized in that wherein,~~ over [the] a length of the trailing edge [(22)] ~~each of said blade (2) blades,~~ [the] an angle (β_2) between said linear speed (U , D_2) said direction defined by the linear component (U) and [said] a straight

~~median~~ line $[(25,)]$ (Δ_2) extending from the median line of each of said blades at said trailing edge thereof has an average value ~~included~~ between 20 and 30°.

4. (currently amended) ~~Runner~~ The runner according to Claim 1, ~~characterized in that~~ wherein, over $[(the)]$ a length of the leading edge $[(21)]$ of each of said blade (2) blades, $[(the)]$ an angle (β_1) between said direction defined by the linear component (U) ~~linear speed (U, D_1)~~ and $[(said)]$ a straight ~~median~~ line $[(25,)]$ (Δ_1) extending from the median line of each of said blades at said leading edge thereof has a value ~~included~~ between 70 and 120°.

5. (currently amended) ~~Runner~~ The runner according to Claim 1, ~~characterized in that the~~ wherein an angle (β_{14}) between said ~~linear speed (U, D_{214})~~ direction defined by the linear component (U) and $[(said)]$ a straight median line $[(25,)]$ (Δ_{214}) extending from the median line of each of said blades at said leading edge thereof has, in the vicinity of $[(the)]$ said point $[(214)]$ of attachment of each of said blade (2) blades on said band $[(4)]$, a value ~~included~~ between 70 and 120°.

6. (currently amended) ~~Runner~~ The runner according to Claim 1, ~~characterized in that the~~ wherein an overlap angle between ~~[[the]]~~ said leading edge ~~[[(21)]]~~ and ~~[[the]]~~ said trailing edge ~~[[(22)]]~~ of each of said ~~blade (2)~~ blades has, viewed in a direction parallel to ~~[[the]]~~ an axis of rotation (X-X') of the runner ~~[[(1)]]~~:

~~[[.]]~~ at ~~the level of the~~ said band ~~[[(4)]]~~, a value (ϕ_{24}) less than 25° ~~[[.]]~~;

~~[[.]]~~ at ~~the a level of the~~ said crown ~~[[(3)]]~~, a value (ϕ_{23}) less than 37° ; and

~~[[.]]~~ on average, over ~~the length~~ lengths of ~~[[the]]~~ said leading and trailing edges, a value (ϕ_m) less than 31° .

7. (currently amended) ~~Runner~~ The runner according to Claim 1, ~~characterized in that~~ wherein said band ~~[[(4)]]~~ has a meridian section such that ~~[[its]]~~ a minimum diameter (D_{min}) of said band over ~~[[the]]~~ a central third ~~[[(43)]]~~ of ~~[[its]]~~ a height (h_4) of said band is ~~less by~~ at least 2% less with respect to ~~[[the]]~~ a diameter (D_{224}) of said band at ~~the level of the~~ said points of attachment ~~[[(224)]]~~ of ~~[[the]]~~ said trailing edges ~~[[(22)]]~~ of said blades ~~[[(2)]]~~ on said band.

Appl. No. 10/527,688

8.(currently amended) ~~Hydraulic~~ A hydraulic machine of Francis type equipped with a runner, said runner comprising: (1)
according to Claim 1

a crown;

a band; and

blades extending between said crown and said band such that
a leading edge of each of said blades has points of attachment
with said crown and said band and a trailing edge of each of said
blades has other points of attachment with said crown and said
band, said blades defining between themselves channels for flow
of liquid and being rotatable with said crown and said band in a
direction defined by a linear component (U), and each of said
blades has oppositely oriented lateral faces which are spaced
equidistant from an imaginary curved median line extending from
said leading edge to said trailing edge;

wherein an angle (β_{24}) between the direction defined by the
linear component (U) of each of said blades and a straight line
(Δ_{224}) extending from the median line of each of said blades at
said trailing edge thereof, has, at said point of attachment of
each of said blades on said band, a value between 20 and 25°.

9. The hydraulic machine ~~Machine~~ according to Claim 8, ~~characterized in that it comprises~~ further comprising a turbine delivering an equivalent power under high load (P_{11FC}), which corresponds to ~~[[the]]~~ a power of ~~[[the]]~~ said turbine at a working point (B) where the efficiency is less by 3.5% than the efficiency at ~~[[the]]~~ an optimum working point (A), under one ~~[[metre]]~~ meter of head and with a runner outlet diameter of one ~~[[metre]]~~ meter, expressed in kilowatts, such that ~~[[its]]~~ a ratio with ~~[[the]]~~ a speed of rotation (N_{11}) of said turbine under the same conditions, expressed in ~~[[revs]]~~ revolutions per minute, has a value ~~included~~ between 0.16 and 0.175.